

TURNING DEVICE FOR LUMBER AND THE LIKE

BACKGROUND OF THE INVENTION1. Field of the Invention

5 [001] The present invention relates to lumber handling devices and, more particularly, to a high-speed lumber turning device.

2. Description of the Prior Art

10 [002] In the art of handling of lumber, such as boards, planks, battens, etc., it is often necessary to turn the pieces of lumber upstream of a planing machine or the like to have the most irregular shape side of each piece (flash sides) facing upward to optimize the planing of the wood piece. This upward
15 orientation is due to the fact that, in saw mills, the thickest layer is removed from the top due to the adjustment of the cutting tools of the planing machines. Presently, because of the absence of adequate, reliable and efficient systems able to
20 operate at high speeds, lumber industries frequently use manual labor to turn the wood pieces. This process has incurred many problems relating to the employees, such as tendinitis and the like, and to employers (quality of the work, profitability).

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SUMMARY OF THE INVENTION

[003] It is therefore an aim of the present invention to provide a turning device for selectively turning wood pieces or the like to a desired position on a
30 high-speed conveyor.

[004] Therefore in accordance with the present invention, there is provided a turning device for use in concert with a conveyor adapted to feed elongated wood pieces one-by-one to the turning device,
35 comprising:

[005] at least one turning member moveable between an idle position and an operational position;

[006] a sensor located upstream of said turning member, for scanning the wood pieces on the conveyor; and

1007] an operator controlled by said sensor and
5 adapted, when actuated, to selectively cause said
turning member to be displaced to said operational
position for turning a given elongated wood piece on
the conveyor to a desired position.

[008] Also in accordance with the present invention,
10 there is provided a method for turning an elongated
wood piece carried by a conveyor, comprising the
steps of:

[009] providing a sensor to determine if a wood piece is to be turned on the conveyor; and

15 [0010] b) providing a motorised turning member
automatically operated if it has been determined in
step a) that the wood piece is to be turned such as
to cause the elongated wood piece to be turned on the
conveyor by said turning member to a desired
20 position.

BRIEF DESCRIPTION OF THE DRAWINGS

25 [0011] Having thus generally described the nature of the invention, reference will now be made to the accompanying drawings, showing by way of illustration a preferred embodiment thereof, and in which:

[0012] Fig. 1 is a fragmented side elevational view of an embodiment of the turning device in accordance with the present invention;

30 [0013] Fig. 2 is a top plan view of the turning device
of Fig. 1;

[0014] Fig. 3 is a rear end elevational view of the turning device of Fig. 1; and

35 [0015] Fig. 4 is a fragmented side elevational view of the turning device similar to Fig. 1 but showing a wood piece in the process of being turned.

品名	単位	数量	金額	備考
小麦	kg	100	1000	
大豆	kg	50	500	
米	kg	200	2000	
雑穀	kg	30	300	
油	kg	10	100	
塩	kg	5	50	
糖	kg	10	100	
茶	kg	5	50	
酒	kg	10	100	
肉	kg	10	100	
魚	kg	10	100	
野菜	kg	10	100	
果物	kg	10	100	
その他	kg	10	100	
合計			10000	

[0016] In accordance with the present invention, Figs. 1 to 4 illustrate a turning device 10 operating in parallel with a chain conveyor 12 comprising a plurality of stoppers 14 carrying a lumber piece 16 between each pair of successive stoppers 14 generally in abutment with the downstream stopper thereof. The turning device 10 comprises a first chain 18 defining a closed circuit and in operative contact with primary gears 20 and 22. The primary gear 22 is idle and free to rotate, while the primary gear 20 and a secondary gear 24 are fixedly mounted on a common shaft 26, as best shown in Fig. 2, such that both gears 20 and 24 rotate in concert. The secondary gear 24 is operatively connected to a second chain 28, which is driven by a secondary gear 30. The secondary gear 30 is rotatively engaged to a drive shaft 32, further driving the chain conveyor 12.

[0017] In reference to Fig. 1, the first chain 18 defines a generally horizontal obround shape and has a top side 34 extending parallel and at a same level as a top side 36 of the chain conveyor 12. The lumber pieces 16 are carried by the stoppers 14 on the top side 36 of the chain conveyor 12.

25 [0013] As best seen in Fig. 4, the turning device 10
further comprises hooks 38. Each of the hooks 38
comprises a tip 39 at a free end thereof and an
opposed end 40 provided with a bearing that is
pivotally mounted to the first chain 18 by means of a
30 bolt and nut assembly 42 thereby allowing the hook 38
to pivot with respect to the first chain 18. The
bearing may be a ball bearing or the like. Each of
the hooks 38 further comprises a guide pin 44
laterally projecting therefrom.

35 [0019] A template 46 is disposed adjacent and parallel
the closed circuit defined by the first chain 18. The
template 46 defines a guide track 47 comprising a

generally oblong main section 48 and a by-pass section 50. The pins 44 of the hooks 38 are slidably engaged in the guide track 47 of the template 46, whereby the pins 44 of the hooks 38 slide along the guide track 47 when driven by the first chain 18.

[0020] A lever 52 is fixed at a lower end thereof to a shaft 54. An opposed upper end of the lever 52 comprises a deflector 56. The lever 52 is positioned such that, as a in result of a counterclockwise

rotation of the shaft 54, the deflector 56 will obstruct the guide track 47 to deflect the pin 44 of a selected of hook 38 from the main section 48 into the by-pass section 50. As best shown in Figs. 2 and 3, the shaft 54 has a fixed flange 58 radially

projecting therefrom in cooperating engagement with a trunnion 60 located at an end of a shaft 62 of a pneumatic cylinder 64, whereby a retraction of the shaft 62, upon actuation of the cylinder 64, causes a pivot of the flange 58 and thus a partial rotation of the shaft 54, thereby raising the deflector 56.

[0021] The closed circuits defined by the first and second chains 18 and 28 are sized and positioned such that the tips 39 of the hooks 38 may move upward from the top side 36 of the chain conveyor 12 slightly

before each stopper 14 if the pins 44 thereof become engaged in the by-pass section 50, as depicted in Fig. 4. For instance, the primary gears 20 and 22 and the secondary gears 24 and 30 of the present turning device 10 may have the same specifications to provide a 1:1 ratio, whereby the first chain 18 and the chain conveyor 12 move at the same speed and in the same direction.

[0022] A sensor device 66 as known in the art, located upstream of the turning device 10, scans the lumber pieces 16 carried by the stoppers 14 of the chain conveyor 12 for analyzing whether the most irregular side of the scanned lumber piece 16 faces upward or

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downward. If the lumber piece 16 is not in the desired position, a signal is sent from the sensor device 66 to a controller (not shown) wherefrom the lever 52 of the turning device 10 is actuated, as described above, to deflect the pin 44 of an appropriate hook 38 in the engagement by-pass section 50. The tip 39 of the hook 38 so engaged in the by-pass section 50 strikes the downward facing side of the lumber piece 16 (see Fig. 4), thereby turning it by 180° to achieve the desired position of the lumber piece 16. The deflector 56 will continue to obstruct the main section 48 as long as the sensor 66 detects successive lumber pieces 16 which need to be flipped over. The hooks 38 are positioned with respect to the stoppers 14 such as to ensure a proper rotation of the wood pieces 16.

[0023] The turning device 10 is generally used upstream of a planing machine to optimize the planing of the wood pieces by positioning the flash side thereof upwardly, or downstream of the planing machine to classify the pieces in different categories. The turning device 10 is simple and its small size allows for an easy adaptation to a chain conveyor. The speed of operation of the turning device 10 may vary (e.g. 30 to 200 pieces per minute). The turning device 10 may be used with wood pieces of varying specifications (e.g. range of width: 2.5 to 12 inches, and of thickness: 1 to 4 inches).

[0024] Such a turning device increases the efficiency, the speed and the productivity of the wood turning process. Furthermore, it provides a considerable ergonomical aspect as its use allows for a decrease in the manual work which is a source of tendinitis and other diseases.